CWA §316(b) BPJ BTA and Hydroelectric Generating Facilities

Background

OW was briefed last fall on the applicability of the 316(b) Existing Facility Rule to hydroelectric generating facilities (see attached). Based upon that briefing, OWM was informed that hydroelectric generating facilities would not be subject to the Rule. When a facility is not subject to the rule, 316(b) is applied on a site specific BPJ basis to determine BTA to comply with the statutory requirements (40 CFR 125.90(b)).

OWM understands that OW had a series of discussions with UWAG on their comments submitted on the Region 10 General Permit for hydroelectric facilities in Idaho regarding the applicability of the statute to such facilities as well as the Rule. Additionally, UWAG, on behalf of their constituents, stated they had concerns with the application of BPJ to these facilities if the statute was applicable. OWM was tasked wth exploring this concern further.

UWAG's concerns

At a meeting with UWAG and OWM, UWAG discussed their concern with BPJ, but were only able to express one specific issue. The issue expressed was that requirements in other federal or state licenses or permits that address impacts to aquatic life should not be required as conditions of the NPDES permit. An example of this is a Section 7 consultation on a FERC license that specifies measures to prevent impingement and entrainment of listed species into the dam penstocks. These measures would route larval and juvenile fish around the dam during downstream migration and thus also be technologies that would be applicable to meeting the CWA 316(b) statutory standards to minimize adverse impacts from operation of the cooling water intake structure (in most dams, the intake is located in the penstock or the scroll case of the turbine).

UWAG was concerned that these technologies were a requirement of the FERC license and that having them as enforceable conditions in the NPDES permit would introduce a "dual jeopardy". UWAG also expressed that the technologies, even though they would provide a benefit to meeting the CWA 316(b) standards, were not specifically associated with the cooling water intake structure and were installed primarily to reduce impacts from the movement of generating water through the dam, not use of cooling water. OWM proposed that it would be a viable approach to consider such conditions (if mandatory and enforceable) in other licenses or permits as "background" conditions that informs the BTA determination but are not part of BTA themselves.

OWM's information gathering

At OWM's request, UWAG facilitated a series of meetings with a diverse group of hydroelectric facilities and OWM staff to share information on:

1) how the FERC licensing process applicable to non-federal projects addresses aquatic impacts;
2) the various types of dams and the configurations of the penstocks and locations of the cooling water intake structures;
3) what controls or technologies that might affect impingement or entrainment at the cooling water intake structure were required by other licenses or permits;
4) any other concerns regarding CWA 316(b) that the specific permittees might have about a facility under their control.

BPJ BTA for hydroelectric facilities

OWM generally expects that BPJ can be applied such that the dam's existing controls are the BTA. OWM believes that four factors can be used as "technologies" that minimize adverse impacts from the use of a cooling water intake structure at hydroelectric facilities.

Factors applicable to all facilities:

1) Efficiency of power generation
   - EPA identified that water use reduction was a factor that addressed impacts due to both impingement and entrainment. Water use reduction is most commonly associated with closed cycle cooling tower use, but water use reduction through other means provides the same benefit. Looking holistically at power generation and the cooling water used per megawatt generated, hydroelectric facilities are more efficient than a steam electric facility as they generate less waste heat.
   - The several facilities that discussed their operations provided information that supported this finding for their facilities. Ex. 5 Deliberative Process (DP)

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     Ex. 5 Deliberative Process (DP) OWM would need more data to develop a "national" demonstration on hydroelectric Ex. 5 Deliberative Process (DP) In discussions with UWAG to explore their comfort with these BTA factors, UWAG recognized the data gap and was considering options to provide EPA such data to support this demonstration.

2) Cooling water withdrawn relative to waterbody volume or flow
   - EPA has identified in previous rulemakings that using a low percentage of the waterbody flow or volume for cooling could be a factor that addresses impacts due to entrainment. In the New Facility Rule, EPA established "proportional-flow requirements" that were intended to provide additional protections in addition to the commensurate with closed cycle and velocity requirements. For rivers and streams, EPA found that,

     > *"The 5 percent value for rivers and streams reflects an estimate that this would entrain approximately 5 percent of the river or stream's entrainable organisms and a policy judgment that a greater degree of entrainment reflects an inappropriately located facility."*

     In the meetings with several facilities, the cooling water withdrawn at each facility is a small fraction of the water passed through the dam for generating purposes, often less than 1%. We believe nationwide that such withdrawals will be below 5%. Thus, this is a factor that can be used to support that impacts from entrainment are minimized on a BPJ basis.
   - Proportional flow requirements only address entrainment as most passive floating organisms that are addressed by this factor are not of impingeable size. Impingement rates might be affected by a reduced flow, but in this case, there is no water use reduction, merely an overall minimal withdrawal of water relative to the waterbody flow or volume so credit for impingement reductions is not assumed.

Factors applicable to many facilities:

3) Location of the intake structure
   - EPA identified that the location of the intake could be a factor that addressed impacts due to both impingement and entrainment. Location of the intake in areas with lower densities of

impingeable or entrainable organisms would reduce the adverse impacts associated with use of the cooling water intake structure.

- For hydroelectric facilities, most of the intakes are located in the dam itself, either in the penstocks or the scroll case of the turbine. Generally, dams are designed such that the location of the penstock openings on the dam face are located at a depth with a lower density of organisms to reduce entrainment through the dam thus minimizing impacts from the operations of the turbine. As the cooling water intake structure is within the dam, there is a similar reduction in the density of organisms as compared to an intake on the face of the dam or in the waterbody itself.
- Some dams do have intakes on the face of the dam or in the waterbody so this may not be applicable to all hydroelectric facilities. The permitting authority would evaluate the need for further controls under BPJ in these cases and may determine that not further controls are necessary. However, the constraints associated with intakes located in the penstocks would not be applicable and may lead to the determination that further controls are feasible and economically available.

4) Technologies at the intake
   - EPA identified that design of the intake can be a factor that addressed impacts due to impingement. Many of the facilities have some form of screen over the intake pipe; generally this was intended for debris protection, but provides some level of impingement control versus an open pipe. EPA considers organisms that would be retained on a certain mesh size to be "impinged" even if there is no comparable screen on the intake pipe and the organism may actually pass through the cooling system.
   - Most of these intakes rely upon a passive gravity feed which in some cases might lead to a lower intake velocity than a pumped system. However, this lower intake velocity may not be realized for hydroelectric facilities as the generation water is moved at higher velocities to drive the turbines than would be experienced in normal flow velocity in a waterbody.
   - However, this higher velocity results in a higher sweeping velocity past the opening of the intake thus minimizing the time in which an organism can be "impinged". Impinged organisms are often of a size that they have enough motility that when they sense a screen or the opening of the intake, they have an avoidance response and swim away. Combined with the sweeping velocity that carries the organism past the intake rapidly, this can minimize the actual impingement of organisms.

Conclusion

OWM did not find any barriers to the approach described to address the FERC licensing issue and found that existing controls can in most cases be determined to be BTA.

One general caveat to the above approach is that BPJ is at the discretion of the permitting authority which in most cases will be a state. Ex. 5 Deliberative Process (DP)

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Additionally, for EPA-issued permits, EPA must consult with the Services if listed species are present in the vicinity of the dam which may lead to additional controls.